

Mandrel for a film-spool support having surface adherency

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Cited documents:

US3070281 (A)

US3179245 (A)

DE2617425 (A1)

US3940081 (A)

FR1547961 (A)

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Abstract of FR 2581633 (A1)

This mandrel is of the type made from rigid material which cannot deform under the radial clamping stresses generated by the turns 3 wound on it. According to the invention, it has, on its periphery, means 6 enabling its external diameter to be reduced.

Description of FR 2581633 (A1)

Adhesive films having an adherence of surface, i.e. films, or stretchable films presenting in surface an adherent capacity are stored by rolling up on rigid chucks. Under the effect of the temperature but

also in time, it frequently happens that the whorls of film spool resulting from sheath tubular and comprising certain types of sticking agents, telescope i.e. move the ones compared to the others on the axis longitudinal of the spool as represented on figure 1 annexed. This displacement which reaches tens of centimetres makes unusable the spool. The phenomenon at the base of this displacement seems to be due to the conjunction of the temperature, the stress relaxation being exerted on the whorls following their rolling up under tension, and of percentage of agent sticking which, under certain conditions, creep and supports the transverse slip of the whorls.

To cure that, various solutions were tried. It is thus of the reduction of the tension of embobinage, of the realization of grooves on the chucks, of the reduction of the percentage of sticking agent and rolling up with shift of a film locally comprising extra thickness forming of the veins. These solutions modify the characteristics or the aspect of film without to be completely effective.

Treatment CQRONA seems to give satisfaction but is expensive.

The use of particular additives added with composition of film, valid for extrusion out of die punt, is not appropriate for films carried out by cutting of a tubular sheath formed by extrusion-inflation.

The only solution currently adopted is the reduction of diameter external of the film spool so as to reduce the constraint of tightening on the whorls and the risks of telescoping.

It results a limitation from it the rolled up length, one increase in handling at the time of the realization of spool but also during its use, therefore the many ones perturbing disadvantages the development of stretchable film.

The purpose of the present invention is to cure these

disadvantages by providing an allowing chuck, by its only structure, and without modification of the conditions of manufacture of film, to obtain spools and reels of large stretchable film diameters not telescoping longitudinally in time and under the action of temperature.

For this purpose, the chuck, made out of material rigid, present on its periphery, of the means allowing a reduction of its external diameter.

Thus, after rolling up of the whorls of films, relieving constraints of tightening leads to a reduction of the diameter external of the chuck, reduction releasing the constraints in the closest whorls, and gradually, in following whorls. This directed release is opposed to creation of longitudinal constraints supporting it telescoping and is thus opposed to this telescoping.

In a form of execution of the invention, the chuck is wrapped by an external compressible material sleeve.

This sleeve, of low costs, is compressed on the chuck subjacent progressively of the relieving of constraints in the whorls. It makes it possible to increase and even to even double the diameter of rolling up of film on chuck without risk of telescoping of its whorls.

In another form of execution, the chuck comprises, in projection of its outside, the longitudinal fins inclined ready to fold back itself gradually against this face during the stress relaxation in the whorls of film rolled up on him.

Other characteristics and advantages will arise from description which follows in reference to the diagrammatic drawing annexed representative as nonrestrictive examples, of the forms of execution of this spool.

Figure 1 is a sight in prospect for a spool afterwards telescoping of its whorls,

Figure 2 is a sight in prospect for the chuck according to

the invention,

Figures 3 and 4 are figures on side of rise in one

spool respectively, immediately after rolling up of film on the chuck according to the invention and after stress relaxation in the whorls,

Figure 5 is a sight in prospect showing an alternative for realization of the sleeve.

On figure 1, (2) indicates a rigid matter chuck such

that out of paperboard or synthetic matter on which the whorls (3) of a film (4) having an adherence of surface, telescoped i.e. moved on the axis

longitudinal of the chuck (2) in the direction of the arrow (5).

This figure highlights the disadvantages of it

telescoping which ensures a complete deformation of the spool.

According to the invention, the chuck (2) intended to receive

the film rolling up (4) is made out of rigid material and comprises on its periphery of the means allowing a reduction of its external diameter.

In the form of execution represented on figures 2 to 4, these means are consisted a sleeve made out of material compressible and for example, by a foam sleeve of

polyethylene. This sleeve can, for example, being consisted a sleeve having an internal diameter lower than the diameter external of the chuck (2) so as to be able to be maintained by tightening on this one.

This chuck is used like the traditional chuck, i.e. receives the film rolling up (4) which forms on him whorls (3) as represented on figure 3. In the phase of stress relaxation affecting the whorls, phase which of known way, is carried out according to the room temperature in

24 or 48 hours following the realization of the spool, then

the whorls closest to the sleeve (6) are released from their

forced by exerting radial constraints on the compressible sleeve (6) and are followed gradually by

following whorls. The various whorls are thus subjected to a radial buckling multipoint giving them a pace festooned as represented on figure 4. The use shows that the progressive crushing of the sleeve (6) releases really the constraints in the whorls which do not tend any more to slip the ones on the others.

It results from it that the spool, thus produced, is not likely to telescope in time and can thus receive more whorls without risk.

Tests were carried out with a chuck of which the body

tubular out of paperboard had a diameter external of 97 mm and an internal diameter of 77 mm. This chuck was wrapped by a polyethylene foam sleeve having a 2 mm thickness, an internal diameter of 95 mm. The chuck had a length of 520 mm and the sleeve of 510 mm. After installation of

sleeve on the chuck (2), a linear polyethylene film 23 microns thickness was rolled up to form one spool having a diameter external of appreciably 290 mm corresponding to the dimension of the current spools. Afterwards manufacture, the spool was stored during 40 days in a room subjected to an average temperature of 40 °C. After a few hours of storage, the interior whorls of the spool have started to scallop. This release of the constraints was transmitted gradually to the closest whorls. At the end of four days, the 2/3 the thickness of the spool were affected then the phenomenon continued in an increasingly slow way as one approached external whorls. At the end of the 40 days, the spool had not undergone any telescoping of its whorls and was reeled. Thus, it was noted that, as opposed to what it occurs in the traditional spools where the joining of the last whorls prevents from using its last whorls, those could be reeled completely without any problem. After unwinding of the totality of film, the sleeve (6) out of compressible matter was examined. Its thickness was not any more whereas of 0,1 mm.

These tests highlight that the chuck, according to the invention, allows without modifying the conditions of manufacture of a film presenting an adherent capacity in surface, to remove any telescoping of the whorls and, in consequence, to increase the dimension of the reels.

It is obvious that the invention is not limited to the form of execution which was described above but that it aims all the chucks provided with means giving them a diameter variable, i.e. reducible outside gradually under a radial compression whatever the nature of material constitutive of the rigid chuck which can be in paperboard, out of steel or synthetic resin and whatever the means authorizing this reduction of diameter. Thus the compressible sleeve can also be formed by the first layers of the film of which rolling up should be ensured, these first layers being made up of the matter constitutive of film associated with an introduced inflating agent in the machine of extrusion, but also by a layer of foam polyethylene Co-extruded at the same time as the chuck (2) out of synthetic matter.

In the alternative represented on figure 5, the sleeve (6a) comprises projecting its ~ outside, wings longitudinal (7) tilted and ready to fold back itself against this sleeve. Under these conditions, the

sleeve (6a) is produced in a material rigid or semi-rigid and only the elasticity of these wings makes it possible to reduce its external diameter. These wings can also be realized directly on the chuck (2) which is then extruded uninterrupted and divided with the desired length.

This spool which was described within the framework of its application to the stretchable film rolling up comprising an adherence of surface, can also be used for any other film of which one of the faces has an adherence of surface or one adhesive and, for example, for the rollers of adhesive tapes which are also sensitive to the phenomenon of telescoping in time and for printed films presenting, after realization of the constraints, an adherence between whorls slowing down them unfolding.

## CLAIMS

1. Chuck for film spool presenting an adherence of surface, chuck (2) of the type made out of rigid material indeformable under the constraints of radial tightening generated by the whorls (3) rolled up on him, characterized in that it presents on its periphery of the means (6-7) allowing one reduction of its external diameter.
2. Chuck according to claim 1 characterized in that it is wrapped by an external sleeve (6) out of material compressible.
3. Chuck according to the whole of claims 1 and 2 characterized in that it is wrapped by a sleeve external (6) out of polyethylene foam.
4. Chuck according to claim 3 characterized in that the sleeve (6) has, at rest, an internal diameter smaller than the diameter external of the chuck (2) so as to be maintained by tightening on this chuck (2) after hafting on him.
5. Chuck according to any of claims 2 to 3 characterized in that the sleeve comes from extrusion with chuck (2) out of rigid synthetic material.

6. chuck according to claim 1 characterized in that it comprise, projecting its outside, wings longitudinal tilted (7) ready to fold back itself gradually on this face during relieving of constraints of the film spool.

7. Chuck according to claim 6 characterized in that the wings (7) are interdependent of the chuck.

8. Chuck according to claim 6 characterized in that the wings are interdependent of a sleeve (6a) referable on the chuck.